



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/681,136	01/20/2001	David S. Hardin	00H1450	7332

24234 7590 06/10/2005

SIMMONS, PERRINE, ALBRIGHT & ELLWOOD, P.L.C.  
THIRD FLOOR TOWER PLACE  
22 SOUTH LINN STREET  
IOWA CITY, IA 52240

EXAMINER

ZHEN, LI B

ART UNIT PAPER NUMBER

2194

DATE MAILED: 06/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/681,136

Applicant(s)

HARDIN ET AL.

Examiner

Li B. Zhen

Art Unit

2194

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2005.  
2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4,6,9-14 and 19-37 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1,4,6,9-14 and 19-37 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

RD

**DETAILED ACTION**

1. Claims 1, 4, 6, 9 – 14 and 19 – 37 are pending in the application.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1, 4, 6, 9 – 14 and 19 – 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent NO. 6587937 to Jensen et al. [cited in previous office action] in view of Patent Application Publication NO. 2002/0083110 to Kozuch et al.**

4. As per claim 1, Jensen teaches the invention substantially as claimed including the method comprising the steps of:

establishing a plurality of virtual machines [col.3, lines 38-39];

establishing a plurality of partitions of processor time [60, FIG.4, col.3, lines 53-54];

assigning each virtual machine of the plurality of virtual machines to a partition of the plurality of partitions [FIG.4, col. 3, line 57-58]; and

running, on a single processor, each virtual machine during its assigned partition [col. 3, lines 45-46].

5. Jensen does not teach determining whether a virtual machine will be inactive during its assigned partition.

However, Kozuch teaches a power management mechanism in a virtual machine environment [p. 2, paragraph (0016)] including determining, during partition start-up [VMM selects the subset that has the most value to the user from the subsets of VMs identified at processing block 314 using a policy pertaining to user preferences with respect to the VMs. In one embodiment, the policy pertaining to user preferences is predetermined; p. 3, paragraph 0029] if a virtual machine will be inactive during its assigned partition [VMM determines which subsets of the active VMs can remain active without exceeding the power available to the host platform; p. 3, paragraph (0028)]. Kozuch teaches the executing a plurality of virtual machine on a single processor computer system [p. 2, paragraph 0016]; therefore, the single processor will be divided into a plurality of partitions or time slices so that each virtual machine can take turns executing on the processor. Kozuch's predefined policy determines whether a virtual machine remains active or not and since the policy is predefined, the policy would be known during partition start-up.

6. It would have been obvious to a person of ordinarily skilled in the art at the time of the invention to apply the teaching of determining whether a virtual machine will be inactive during its assigned partition because reduces the resource requirements of VMs by stopping one or more VMs that are not being used [p. 3, paragraph (0026) of Kozuch].

7. As per claim 4, Jensen as modified teaches the assigning step takes into account results of prior determining steps in making a decision for the next process step [selects the subset that has the most value to the user from the subsets of VMs identified at processing block 314 using a policy pertaining to user preferences; p. 3, paragraph (0029) of Kozuch].

8. As per claim 6, Jensen as modified teaches the step of determining inactivity in a device and placing the single processor into a reduced power mode that has been determined to be inactive by the determining step [VMM may then reduce the power consumption of one or more devices which were partially or fully allocated to the saved VM, thereby adjusting to the decrease in the available power; p. 3, paragraph (0027) of Kozuch].

9. As per claim 9, Jensen as modified teaches the reduced power mode is terminated at the end of the partition assigned to the inactive virtual machine [VMM then saves the current state information of this VM...and stops this VM ...the resources allocated to the VM are freed; p. 3, paragraph (0027) of Kozuch].

10. As per claim 10-12, Jensen as modified teaches reassigning, to another virtual machine, where previously assigned virtual machine has been determined to be inactive

Art Unit: 2194

[when any of the VMs that were stopped becomes active, the VMM restores the state of this VM using the saved state information; p. 3, paragraph (0031) to Kozuch].

11. As per claims 13 and 20, these are rejected for the same reasons as claims 1 and 6 set forth hereinabove.

12. As per claim 14, Jensen teaches wherein the processor comprises an embedded, low power processor [col.1, line 15].

13. As per claim 19 and 22, these are rejected for the same reasons as claim 13 set forth hereinabove. In addition, Jensen as modified teaches activating a subsequent virtual machine during a partition assigned to an inactive virtual machine [p. 3, paragraph (0029) of Kozuch].

14. As per claim 21, this is rejected for the same reasons as claim 1, 6, and 10 set forth hereinabove.

15. As per claim 23, this is rejected for the same reasons as claims 1,6, and 10 set forth hereinabove.

16. As per claims 24 and 26, these are rejected for the same reasons as claims 4 and 19 set forth hereinabove.

17. As per claim 25, this is rejected for the same reasons as claims 4, 10, and 19 set forth hereinabove.

18. As per claim 27, this is rejected for the same reasons as claims 4, 10, and 19 set forth hereinabove.

19. As per claim 28, this is rejected for the same reasons as claims 1 and 13 set forth hereinabove.

20. As per claim 29, Jensen as modified teaches determining whether a virtual machine will be inactive by checking a status field for a halt code [determination is made as to whether this signal indicates that the battery used for the host platform is low; p. 3, paragraphs (0033) and (0034) of Kozuch].

21. As per claims 30, 32, 33 and 37, Jensen as modified teaches the halt code indicates the occurrence of an error [resets, interrupts, and other signals to control partition context switching and to report memory range violations; col. 4, lines 1 – 22 of Jensen].

22. As per claim 31, Jensen as modified teaches the halt code indicates that a virtual machine has not loaded [partition timer 203 signals the microprocessor to perform a

Art Unit: 2194

partition context switch and loads the new partition information; col. 4, lines 1 – 23 of Jensen].

23. As per claims 34 and 35, Jensen as modified teaches the halt code indicates that a partition time limit has been exceeded [PMU 200 contains information that may be stored in a memory 202 for each partition or virtual machine in the system. This information provides address range values, execution time limits, and scheduling protocols; col. 4, lines 1 – 13 of Jensen].

24. As per claim 36, wherein the halt code indicates that a power down handler did not complete successfully [col. 4, lines 1 – 22 of Jensen].

### ***Response to Arguments***

25. Applicant's arguments filed March 2, 2005 have been fully considered but they are not persuasive. In response to the Non-Final Office Action dated 9/2/2004, applicant argues:

(1) Kozuch does not determine inactivity during partition start-up [p. 13, lines 13 – 17];

(2) Kozuch does not teach the use of prior activity determination as a factor influencing the assignment of virtual machines to partitions of processor time; [p. 13, line 18 – p. 14, line 3];



(3) Kozuch does not teach the placement of a processor into a reduced power mode for the duration of a specific partition of processor time [p. 14, lines 4 – 10];

(4) Kozuch does not teach reassignment of a partition to a different virtual machine [p. 14, lines 11 – 16];

(5) The identification in Kozuch of those virtual machines deemed to be more valuable provides no teaching concerning the activation of one virtual machine during a partition assigned to a different virtual machine [p. 14, lines 20 – 22]; and

(6) Kozuch does not teach checking of a status code to determine whether a given virtual machine will be active [p. 15, lines 1 – 4].

As to argument (1), examiner respectfully disagrees refers applicant to the rejection of claim 1 above. Kozuch teaches the executing a plurality of virtual machine on a single processor computer system [p. 2, paragraph 0016]; therefore, the single processor will be divided into a plurality of partitions or time slices so that each virtual machine can take turns executing on the processor. Kozuch's predefined policy determines whether a virtual machine remains active or not and since the policy is predefined, the policy would be known during partition start-up.

As to argument (2), examiner respectfully disagrees and submits that Kozuch teaches predefined policy to determine whether a virtual machine remains active or not [p. 3, paragraph 0029]. See also response to argument (1) above.

In response to argument (3), examiner respectfully disagrees and submits that Kozuch teaches reducing the power consumption by stopping the virtual machine [i.e., p. 3, paragraph 0027] and reducing consumption includes reducing power consumption of the processor may be reduced by simultaneously reducing the voltage and frequency supplied, although other mechanisms for reducing the power consumption of the processor may be employed [p. 2, paragraph 16].

As to argument (4), examiner respectfully disagrees and submits that Kozuch activating a virtual machine [p. 3, paragraph (0031)] and in order for a virtual machine to be activated, a partition would have to be assigned to the virtual machine.

In response to argument (5), examiner respectfully disagrees and notes that Kozuch teaches identifying more valuable virtual machines based on a policy and continues executing the more valuable virtual machines [p. 3, paragraph 0029]. The not as valuable virtual machines are stopped and it is obvious the partition that belongs to the stopped virtual machines would be reassigned to the more valuable virtual machines.

In response to argument (6), examiner respectfully disagrees and submits that Kozuch checks a signal to determine whether a battery is running low and the signal determines whether the virtual machine remains active or not. For example, if the battery is not running low, the virtual machines continues to execute [p. 3, paragraph

0033] and if the battery is running low, the virtual machine state is saved and the virtual machine is stopped [p. 3, paragraph 0034].

### ***Conclusion***

26. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li B. Zhen whose telephone number is (571) 272-3768. The examiner can normally be reached on Mon - Fri, 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2194

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Li B. Zhen  
Examiner  
Art Unit 2194

lbz

  
MENG-AI T. AN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100